

# Mechanical Behavior and Microstructure of Nanostructured Steel Wire

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*Published in:*
Proceedings Symposium GG: Mechanical Behavior of Metallic Nanostructured Materials, 2012 MRS Fall Meeting & Exhibit

*Publication date:*
2012

# Mechanical Behavior and Microstructure of Nanostructured Steel Wire

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Cold drawn steel wires can reach an exceptional high tensile strength of 6 GPa (G/13) and they can be plastically deformed at room temperature. Structural parameters and strengthening mechanisms are discussed for structures with a length scale reaching from about 100 to 20 nm and good agreement has been found between experimental and calculated values for the tensile strength which is about 3.6 GPa at a strain of 3.7. Extrapolation of structural paramters and strengthening mechanisms (boundary and dislocation strengthening and solid solution hardening) to a length scale about 10 nm is analyzed and discussed. This length scale is reached at a strain of about 6, where a calculation of the flow stress is in good agreement with an experimental value of about 6 GPa.

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